

## **REMARKS**

This paper is presented in response to the Office Action. No claims are cancelled, amended or added by this paper. Claims 1-45 remain pending in this application. Reconsideration of this application is respectfully requested in view of the following remarks. For the convenience and reference of the Examiner, the remarks of the Applicant are presented in the order in which the corresponding issues were raised in the Office Action.

### **I. Amended Drawings**

The Examiner has objected to Figures 1-6 on the grounds that those Figures are informal. In view of the formal Figures 1-6 submitted herewith, Applicant respectfully submits that the rejection has been overcome and should be withdrawn.

### **II. General Considerations**

Applicant notes that the remarks and amendments presented herein have been made merely to clarify the claimed embodiments from elements purported by the Examiner to be taught by the cited references. Such remarks, or a lack of remarks, and amendments are not intended to constitute, and should not be construed as, an acquiescence, on the part of the Applicant: as to the purported teachings or prior art status of the cited references; as to the characterization of the cited references advanced by the Examiner; or as to any other assertions, allegations or characterizations made by the Examiner in this case. Accordingly, Applicant reserves the right to challenge the purported teaching and prior art status of the cited references at any appropriate time.

In addition, the remarks herein do not constitute, nor are they intended to be, an exhaustive enumeration of the distinctions between any cited references and the claimed invention. Rather, the distinctions identified and discussed herein are presented solely by way of example.

### **III. CLAIM REJECTIONS**

#### **A. Claim Rejections Under 35 U.S.C. §102(b)**

Applicant respectfully notes that a claim is anticipated under 35 U.S.C. § 102(a), (b), or (e) only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. Further, the identical invention must be shown in as complete detail as is

contained in the claim. Finally, the elements must be arranged as required by the claim. *See* Manual of Patent Examining Procedure (“M.P.E.P.”) § 2131.

With particular reference now to the rejection, the Examiner has rejected claim 29 under 35 U.S.C. § 102(b) as being anticipated by U.S. 6,347,106 to *Dijaili et al.* (“*Dijaili*”). Applicant respectfully disagrees with the contentions of the Examiner however and submits that, for at least the reasons outlined below, the rejection of claim 29 should accordingly be withdrawn.

In the rejection, the Examiner has asserted that *Dijaili* teaches “an optical modulator comprising: an external modulator; and a vertical lasing semiconductor optical amplifier (VLSEA) coupled to the external modulator, the VLSEA comprising: a semiconductor active region; an amplifying path traversing the semiconductor active region; and a laser cavity including the semiconductor active region, wherein the laser cavity is oriented vertically with respect to the amplifying path and pumping the laser cavity above a lasing threshold clamps a gain along the amplifying path to a substantially constant value” as recited in claim 29 (emphasis added). The Examiner asserts that support for this rejection can be found at col. 3, lines 1-67, and col. 4, line 10 of *Dijaili*.

Applicant has reviewed the passages of *Dijaili* cited by the Examiner however, and has been unable to find any reference whatsoever to a vertical lasing semiconductor optical amplifier (VLSEA) configured and arranged as required by claim 29. In fact, the majority of col. 3 appears to be devoted to a discussion of various layers of an “HTC layer” (see, col. 3, lines 1-42). Further, while lines 43-60 of col. 3 of *Dijaili* refer to an SOA, Applicant was unable to find any reference in that passage to lasing semiconductor optical amplifiers, or vertical lasing SOAs, configured and arranged as required by the claim. For example, *Dijaili* states “One embodiment of the invention relates to an improvement in a ridge waveguide semiconductor optical amplifier (SOA). Other devices that can share this same basic ridge waveguide structure, except for the end facets, are laser diodes and an edge-emitting light emitting diode (LED)” (col. 3, lines 43-47) (emphasis added). Clearly, the foregoing passage makes no reference to a vertical lasing semiconductor optical amplifier, much less to a VLSEA configured and arranged as required by claim 29.

As noted above, the Examiner also cites col. 4, line 10 of *Dijaili* in support of the rejection of claim 29. The corresponding paragraph states “The latest advances in quantum confined technology. . .and the HTC dielectric technology of the present invention are integrated, as shown in Fig. 2, to achieve a high gain thermally robust semiconductor optical amplifier (SOA) at 1.3  $\mu\text{m}$  and 1.5  $\mu\text{m}$ . Each technology significantly improves the thermal performance and thus, by combining the two, an

unprecedented thermal performance for SOAs is achieved. This enables the operation of a high gain SOA without a thermoelectric cooler, which is presently the limitation in laser module lifetime” (col. 4, lines 9-19). Again, Applicant submits that it is clear that the foregoing passage from *Dijaili* makes no reference to a vertical lasing semiconductor optical amplifier or any other type of lasing semiconductor optical amplifier, much less to a VLSEA configured and arranged as required by claim 29.

In view of the foregoing, Applicant submits that the Examiner has failed to establish that *Dijaili* anticipates claim 29, at least because the Examiner has not established that each and every element as set forth in claim 29 is found in that reference, and because the Examiner has not established that the identical invention is disclosed in *Dijaili* in as complete detail as is contained in claim 29. Applicant thus respectfully submits that the rejection of claim 29 should be withdrawn.

**B. Claim Rejections Under 35 U.S.C. § 103(a)**

Applicant respectfully notes at the outset that in order to establish a *prima facie* case of obviousness, it is the burden of the Examiner to demonstrate that three criteria are met: first, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings; second, there must be a reasonable expectation of success; and third, the prior art reference (or references when combined) must teach or suggest all the claim limitations. See M.P.E.P. § 2143.

**1. claims 1-6, 15, 21, 22, 24, 25, 27, 28, 34 and 42-44**

The Examiner has rejected claims 1-6, 15, 21, 22, 24, 25, 27, 28, 34 and 42-44 under 35 U.S.C. § 103(a) as being unpatentable over US 5,811,838 to Inomoto (“*Inomoto*”) in view of *Dijaili*. Applicant respectfully disagrees with the contentions of the Examiner however and submits that, for at least the reasons outlined below, the rejection of those claims should accordingly be withdrawn.

Inasmuch as claims 2-6, 15, 21, 22, 24, 25, 27 and 28 depend from claim 1, each of those claims requires, among other things, “a vertical lasing semiconductor optical amplifier (VLSEA) coupled to the modulated source for amplifying the modulated optical signal.” As discussed above in connection with the rejection of claim 29 however, the Examiner has failed to establish that *Dijaili* discloses a VLSEA. Further, the Examiner concedes that *Inomoto* fails to disclose a VLSEA, stating “*Inomoto* does not disclose a vertical lasing semiconductor optical amplifier (VLSEA).” Applicant thus submits that it is clear then that even if the *Inomoto* device were modified in the allegedly obvious fashion advanced by the

Examiner, the resulting combination fails to teach or suggest all the limitations of claims 1-6, 5, 15, 21, 22, 24, 25, 27 and 28.

In view of the foregoing, Applicant submits that the Examiner has failed to establish a prima facie case of obviousness with respect to claims 1-6, 5, 15, 21, 22, 24, 25, 27 and 28, at least because even if the purported teachings of the cited references were combined in the allegedly obvious fashion advanced by the Examiner, the resulting combination nonetheless fails to teach or suggest all the limitations of those claims.

Similar to claims 1-6, 5, 15, 21, 22, 24, 25, 27 and 28, claim 34 requires, among other things, a VLSEA. As noted above in connection with the discussion of claims 1-6, 5, 15, 21, 22, 24, 25, 27 and 28, the Examiner has failed to establish that either *Dijaili* or *Inomoto* teaches or suggests a VLSEA, much less a VLSEA configured and arranged as required by claim 34.

In view of the foregoing, Applicant submits that the Examiner has failed to establish a prima facie case of obviousness with respect to claim 34, at least because even if the purported teachings of the cited references were combined in the allegedly obvious fashion advanced by the Examiner, the resulting combination nonetheless fails to teach or suggest all the limitations of claim 34.

Finally, the Examiner has rejected claims 42-44 based on the above-referenced allegedly obvious combination of *Inomoto* and *Dijaili*. Among other things, the Examiner has asserted that "It would have been obvious. . .to use the *Dijaili* amplifier in the *Inomoto* invention to increase the gain of the optical signal since amplifiers are well known for increasing the gain of optical signals." Although it may, in general, be the case that the *Dijaili* amplifier can be used to increase the gain of optical signals, Applicant respectfully submits that the Examiner has not established the existence of a suggestion or motivation to employ the *Dijaili* amplifier with the particular device that is disclosed in *Inomoto*. For example, the Examiner has not established that the output of the *Inomoto* device is such that amplification of that output would necessarily be desirable or required. In fact, *Inomoto* notes that "The waveform of the modulation output provided by modulation at 2.4 Gbps was satisfactory" (col. 5, lines 44-46) (emphasis added). Moreover, even if it is assumed – solely for the sake of argument – that the *Inomoto* device could be modified in the fashion advanced by the Examiner, the mere fact that a modification can be performed is not adequate to establish a prima facie case of obviousness. See M.P.E.P. § 2143.01.

In view of the foregoing, Applicant submits that the Examiner has failed to establish a prima facie case of obviousness with respect to claim 42, as well as with respect to dependent claims 43 and 44, and Applicant thus respectfully submits that the rejection of claims 42 should be withdrawn.

**2. claims 30 and 31**

The Examiner has rejected claims 30 and 31 under 35 U.S.C. § 103(a) as being unpatentable over *Dijaili* in view of US 6,516,017 to Matsumoto ("*Matsumoto*"). Applicant respectfully disagrees with the contentions of the Examiner however and submits that, for at least the reasons outlined below, the rejection of those claims should accordingly be withdrawn.

Inasmuch as claims 30 and 31 depend from claim 29, claims 30 and 31 each require, among other things, "a vertical lasing semiconductor optical amplifier (VLSOA) coupled to the modulated source for amplifying the modulated optical signal." As discussed above in connection with the rejection of claim 29 however, the Examiner has failed to establish that *Dijaili* discloses a VLSOA. Further, the Examiner concedes that *Inomoto* fails to disclose a VLSOA, stating "*Inomoto* does not disclose a vertical lasing semiconductor optical amplifier (VLSOA)." Moreover, the Examiner has not established that *Matsumoto* teaches or suggests the use of a VLSOA as recited in claim 29. Applicant thus submits that it is clear then that even if the *Inomoto* device were modified in the allegedly obvious fashion advanced by the Examiner, the resulting combination fails to teach or suggest all the limitations of claims 30 and 31 and, accordingly, Applicant further submits that the rejection of claims 30 and 31 should be withdrawn.

**3. claims 7-11, 16-20, 23, 35, 36, 38-41 and 45**

The Examiner has rejected claims 7-11, 16-20, 23, 35, 36, 38-41 and 45 under 35 U.S.C. § 103(a) as being unpatentable over *Inomoto* and *Dijaili* as applied to claims 22, 34 and 42, and further in view of *Matsumoto*. Applicant respectfully disagrees with the contentions of the Examiner however and submits that, for at least the reasons outlined below, the rejection of those claims should accordingly be withdrawn.

Applicant respectfully notes that the discussion, above, of claims 1, 22, 29-31, 34 and 42 is germane as well to the rejection of claims 7-11, 16-20, 23, 35, 36, 38-41 and 45. Accordingly, the attention of the Examiner is respectfully directed to such discussion. For at least the reasons outlined in that discussion, Applicant respectfully submits that the rejection of claims 7-11, 16-20, 23, 35, 36, 38-41 and 45 should be withdrawn.

**3. claim 12**

The Examiner has rejected claim 12 under 35 U.S.C. § 103(a) as being unpatentable over *Inomoto* and *Dijaili* as applied to claim 1 and further in view of U.S. 5,657,148 to Feuer et al. ("*Feuer*"). Applicant respectfully disagrees with the contentions of the Examiner however and submits that, for at least the reasons outlined below, the rejection of those claims should accordingly be withdrawn.

Inasmuch as claim 12 depends from claim 1, claim 12 requires, among other things, “a vertical lasing semiconductor optical amplifier (VLSOA) coupled to the modulated source for amplifying the modulated optical signal.” As discussed above in connection with the rejection of claim 29 however, the Examiner has failed to establish that *Dijaili*, or any of the other cited references, discloses a VLSOA configured and arranged as required by the claims. Applicant thus submits that it is clear then that even if the *Inomoto* and *Dijaili* device proposed by the Examiner were modified in the allegedly obvious fashion advanced by the Examiner, the resulting combination fails to teach or suggest all the limitations of claim 12 and, accordingly, Applicant further submits that the rejection of claim 12 should be withdrawn.

**IV. Allowable Subject Matter**

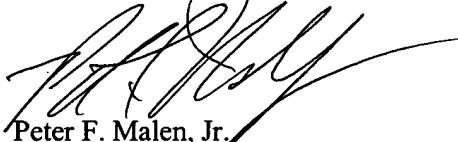
Applicant acknowledges with thanks the indication of the Examiner that claims 13, 14, 32, 33 and 37 would be allowable if rewritten in independent form to include all the limitations of the base claim and any intervening claim, and Applicant also wishes to thank the Examiner for the careful review of those claims. In view of the remarks submitted herein however, Applicant respectfully declines to amend claims 13, 14, 32, 33 and 37 at this time.

**CONCLUSION**

In view of the remarks and amendment submitted herein, Applicant respectfully submits that each of the pending claims 1-45 is now in condition for allowance. Therefore, reconsideration of the rejections is requested and allowance of those claims is respectfully solicited. In the event that the Examiner finds any remaining impediment to a prompt allowance of this application that could be clarified in a telephonic interview, the Examiner is respectfully requested to initiate the same with the undersigned attorney.

Dated this 19<sup>TH</sup> day of August, 2005.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'Peter F. Malen, Jr.', written over a horizontal line.

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**Amendments to the Drawings**

The attached formal Figures 1-6 replace the previously submitted informal Figures 1-6.

Attachments: Formal Figures 1-6